February 22, 1955

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Re our recent discussion of items in question, I can supply the following at this time.

1. On the "B" engine altitude test results, we have now run at altitudes up to and including 70,000'. During these tests we have been able to demonstrate not only the thrusts but also the fuel consumptions shown in our specifications on the -37 engine. Whereas we are pleased with these results, we have been impressed with the necessity for the best possible air distribution at the air inlet and will be interested in the dust tests results you have planned.

2. On tail pipe design, we concur that it is feasible to maintain the full diameter for the length of the tail pipe and then neck down at the exit for proper nozzle size. This nozzle size will have to be adjusted for the internal drag of the tail pipe in order that the turbine outlet pressure may be maintained at the proper value for the desired thrust.

3. On the subject of fuel, we have already had discussions with some of the personnel involved and have suggested the use of the kerosene type fuel to avoid excessive evaporation loss. This could be the military JP5 designation, or our own suggested spec. PWA-522. Regarding your suggestion of "weathering" JP4, this is a matter of degree and our fuel people say if you did enough "weathering" you would loose the light ends or the gasoline portion of the fuel and leave a heavy kerosene type. Whereas we do not have enough experience to accurately compare re-light characteristics of JP4 vs JP5 we do not expect the difference to be very significant.

4. I can not find any objection to removal of the anti-icing line if operation requirements will not need this facility.

5. If the anti-icing valves and line are removed then the only electrical requirement is for the ignition system. A normal start should be accomplished in less than 1½ minutes. Therefore, this will serve as a basis for determining electrical energy requirement.

6. As regards mounting loads on the rear mount ring, I am enclosing Drawing 2S8429 which shows "Allowable Mount and Maneuver Loads." It is possible to attach to the two top mount hole locations providing the links come off at a tangent to the bolt circle diameter and providing the resultant loads are within the allowances shown on the reference drawing. Whereas we do not know your loads the geometry you proposed on the -37 was in accordance with these requirements. In the case of the "C", however, you proposed to come off at an angle of 7° from the tangent. Our tolerance is a maximum of 5° under operating temperatures. If interferences preclude the use of tangential links on the "C" then it may be necessary to pick up the two pair of links on each side of the top center as originally suggested in our Installation Handbook.

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7. On the subject of leaving off the fuel and oil pressure indicators, we can only suggest these are very important. The oil pressure indicator is the only check on satisfactory mechanical condition (other than performance as indicated by tail pipe pressure and tachometer), particularly since you do not have an oil temperature indicator. This should be particularly helpful on any high altitude flights where oil systems may become marginal. Likewise in the case of fuel pressure this is particularly helpful in checking boost pump operation. It is possible for the engine to operate presumably satisfactory with a low inlet fuel pressure but at the same time cavitation at the pump inlet can cause erosion and hence excessive wear.

8. Yourpeople asked for fuel and ignition system schematic arrangements. For this purpose I am enclosing one copy of our Service Instructions on the J57-P-1 and similar model engines withthe August 1954 revision. This does have a schematic diagram and description of the ignition system and also a description of the JFC-12 fuel system. This will suffice, I believe, until a revision can be prepared covering the specific models you may be interested in.

9. Your people also asked about high pressure air bleed out the "2 strut bleed system" vs. the regular H.P. bleeds with either one, two, or four ports. The attached curves No. 74631 and 74632 show the pressures available and indirectly the flow capacity of these ports. It should be noted that out of the regular 4 ports combined it is possible to bleed up to 7% of engine airflow and from the 2 strut system up to 2 to 3%. This represents bleed port capacities and should be distinguished from specification values shown under paragraph 3.17 which indicate maximums taking into account the effects on engine matching and endurance.

R. L. Calcom

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